

still heavier, and the crops were greatly damaged. To these local storms already mentioned, must be added that of the 26th, at Abbotsburg, N. C.; that of the 27th at Leavenworth, Kansas, and that of the 28th, at New Albany, Indiana; the heavy rain-storms near Denver, on the 9th, which flooded railroads and forced them to suspend operations temporarily, and on the 17th and 18th, in the adjacent mountains, seriously interfering with mining work; the storm at Shreveport, La., on the 24th; a furious wind-storm at Cape Henry on the 18th, in which the wind blew 72 miles an hour; the hail-storm at Bismarck, D. T., on the 14th, with many hail-stones two inches in diameter and some much larger.

On the 13th, a severe tornado struck West Point, New York, at 7.10 p. m. The first appearance of it was a black cloud shooting over Crow's Nest. Trees were torn up, and broken off and blown some distance. Teams on the roads were blown over and the window-panes in the exposed portions of the buildings were destroyed. The lightning display was very sharp, and the tornado was accompanied by heavy hail. No loss of life took place.

On the 29th of July a tornado, accompanied by a water-spout reported fifty feet high, passed over Great Bay, near Little Egg Harbor, on the New Jersey coast. The meteor came from the southwest, and was very violent, tearing up trees by the root.

At La Crosse, Wisconsin, on the 24th, (at 8:40 p. m.,) after a densely hazy and smoky day, with falling barometer, a whirlwind of about two hundred yards diameter, passed from northwest to southeast, over the city. Houses and trees were thrown down, and roofs and chimneys lifted from the house-tops while the tornado lasted (about two and a half minutes.) The greatest observed velocity of the wind was eighty miles an hour, though it is possible, for a few seconds, it exceeded that. Torrents of rain fell after the passage of the storm, and great damage was done in the neighborhood.

Another tornado visited the southern part of Fountain county, Indiana, on the afternoon of the 27th with destructive effect, and some reported loss of life. This tornado passed near Brownsburg, Indiana; houses were laid low, and much timber levelled with the ground. It also inflicted much loss in Boone and Hendricks counties. At Vergennes, Vt., a very severe storm was experienced, accompanied by hail, and it proved very disastrous to crops.

### TEMPERATURE OF THE AIR.

This element will be found, as usual, graphically given by the isothermal lines, and in the table in the lower left-hand corner of Chart No. II. One of the most prominent features of the month's weather has been the extremely high temperature in the South Atlantic and Gulf States. The mean temperature of Augusta, Georgia, e. g., is 84°.6—the highest observed there since the station has been occupied, and supposed to be the highest monthly mean in twenty years.

The lowest temperature reported for the month was 40° Fahrenheit, at Pembina, Dakota Territory, and the highest was 107° Fahrenheit, at Shreveport, Louisiana.

The tabular exhibit shows that the July temperature has been 2°.7 above the normal in the South Atlantic States, and 1°.8 above in the Gulf States. The mean was above the normal in the Middle States and the Lower Lake region. Elsewhere (except on the Pacific coast, which has not yet been heard from) the temperature was either at or below the normal. In the Upper Lake region an extremely low mean is found—2°.1 below that which is generally reported in July. This low temperature was very influential in producing the heavy condensation of rain which flooded the Mississippi and Ohio rivers.

*Frosts* occurred on the 20th at Mt. Desert, Maine; in Wayne county, Pa., light frosts on the 2d, 3d, 12th, 19th and 20th; at Hot Sulphur Springs, Colorado, slight frosts were

observed many mornings at daylight; and at Fall River, Mass., white frost on the lowland on the 19th.

### PRECIPITATION.

The rain-fall is exhibited by the figures and shading on Chart No. III, and constitutes one of the most remarkable and significant items of the month's meteorology. From the graphic exhibit of Chart No. III, it will be seen that the rain-fall in the Middle Atlantic States is normal, and that for New England is only a little in excess, while a slight deficiency was reported from the St. Lawrence valley and the Lake region. There was a deficiency of nearly half an inch on the Pacific coast, where the month was nearly rainless. There was a very marked deficiency in the South Atlantic States, and also a large deficiency in the Gulf States. In the heart of the cotton-belt, the rain-fall has been about an inch. The deficiency in Minnesota was also very great, exceeding four inches.

But in the interior, including the Ohio valley and Tennessee, and the central Mississippi and lower Missouri valleys, an equally marked excess of rain was reported. The excess was very great in the lower Missouri valley, amounting to nearly 5.00 inches, while in the Ohio valley and Tennessee the excess has been alarming and almost unparalleled, being five and a half inches more than is usual in July, or nearly three times the normal quantity that falls in that month.

In a large belt of country north of Kentucky and Missouri, the month's rain-fall ranged from 10 to 16 inches—a precipitation which has taxed the central tributaries of the Mississippi beyond their utmost drainage-power, and caused damaging floods and extensive ravages of the growing crops.

Some of the heaviest rain-falls for the month were as follows: At Louisville, 16.46 inches; at Indianapolis, 13.12 inches; at Keokuk, 12.70 inches; at Omaha, 10.00 inches; at Fort Gibson, 10.93 inches. At Beech Grove, Indiana, for the week ending August 1st, the rain-fall was 11.60 inches.

*Rainy Days.*—The number of days on which rain fell in any quantity averages about as follows: In New York and New England, 10; in the Lake region, Minnesota and Dakota, 9; in the Gulf States, 11; in the South Atlantic States, 4; from Nebraska, Kansas, and Indian Territory eastward over Iowa, Missouri, Arkansas, Tennessee, Kentucky, Illinois, Indiana, Ohio, Virginia, Maryland and Pennsylvania, 16. From many stations in the Ohio and central Mississippi valleys, over twenty rainy days, during the month, are reported.

### RELATIVE HUMIDITY.

This element averages 79 per cent. for the immediate Atlantic coast from Cape Hatteras to Maine, and is also very high, ranging from 74 to 81, from the western portions of Pennsylvania, Virginia and North Carolina, westward to Nebraska, Kansas, and Indian Territory. In the Gulf and South Atlantic States it averages 65 per cent., and in New England, New York, and the Lake region, 68. It is somewhat higher than during the month of June at the Rocky Mountain stations, being 30 per cent. at Salt Lake City, 55 at Santa Fé, 56 at Denver, and 58 at Cheyenne.

### WINDS.

The *prevailing winds* have been southerly or southwesterly at nearly all stations except those in the far Northwest and on the Lakes, where northeast and northwest winds have been very frequent. The tendency of the wind, in the Missouri valley, has been to southeast.

*Total movements of the Air.*—The larger total movements of the air for July were as follows: At Cape Hatteras, 10,586 miles; Indianola, 8,248 miles; at stations on the